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(54) Abstract Title
Text inputting using a keypad of an electronic instrument

(57) Inputting text using a keypad (92, Fig. 3) of an electronic instrument such as a cellular phone. The letters of the English alphabet are arranged into a plurality of first character groups, punctuation symbols in a second character group, and Arabic numerals in a third character group, as shown. The first, second and third character groups are assigned to keys on the keypad (Fig. 4). The characters in each of the character groups are also assigned to keys on the keypad. The total number of the first, second and third character groups is less than the number of the keys on the keypad, and the number of letters in each of the first character groups is less than the number of keys on the keypad. To input a character, the relevant character group is selected by operating the corresponding key, and then the character is selected by operating the corresponding key (Fig. 5).

FIRST CHARACTER GROUPS	Lower case character sets	1. a b c d e f g h 2. i j k l m n o p q 3. r s t u v w x y z
	Upper case character sets	1. A B C D E F G H 2. I J K L M N O P Q 3. R S T U V W X Y Z
SECOND CHARACTER GROUP	. . . ? ! ; @ / \ . . .	
THIRD CHARACTER GROUP	1 2 3 4 5 6 7 8 9 0	

FIG. 2

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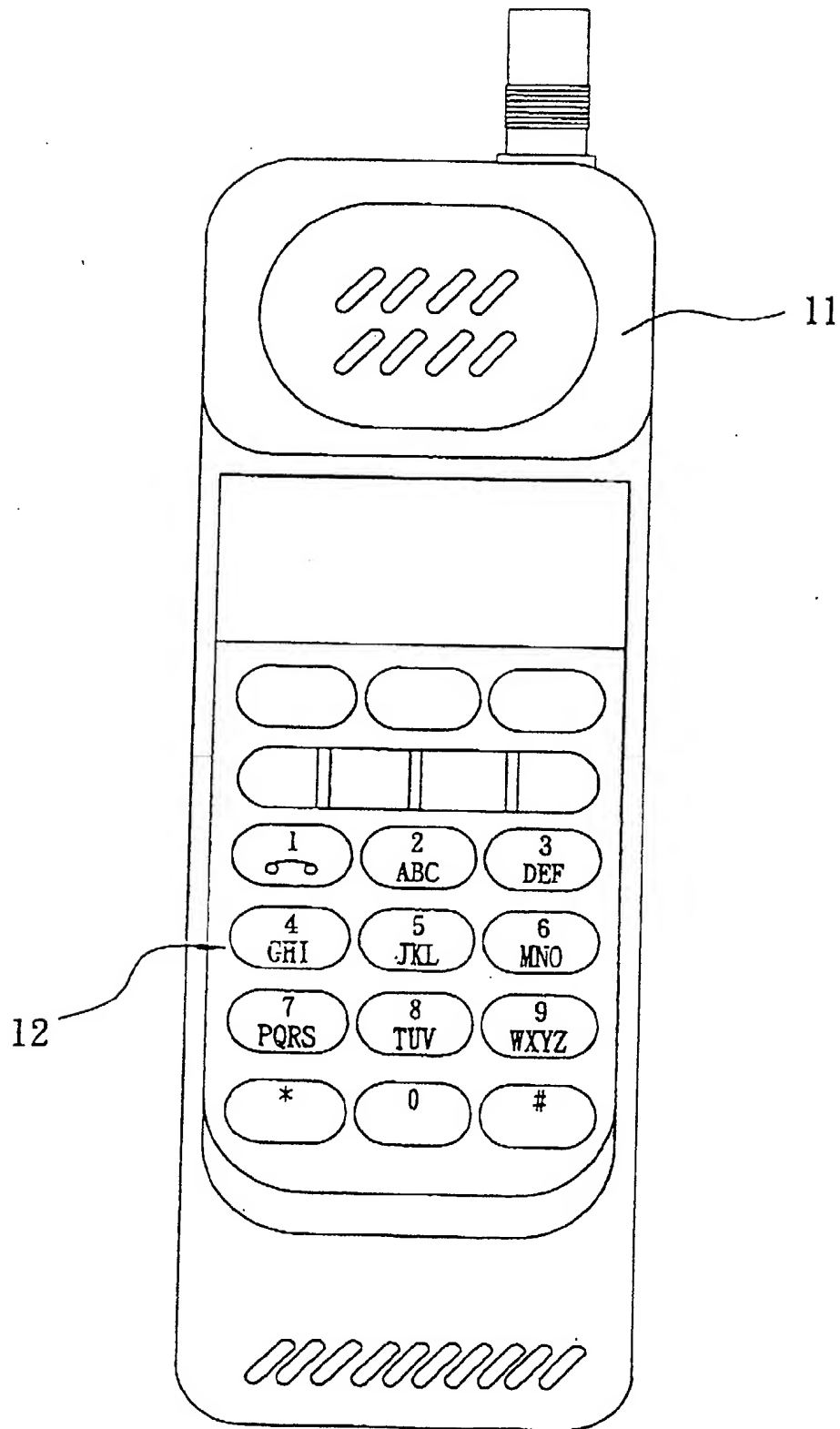


FIG. 1
PRIOR ART

FIRST CHARACTER GROUPS	Lower case character sets	1. a b c d e f g h 2. i j k l m n o p q 3. r s t u v w x y z
	Upper case character sets	1. A B C D E F G H 2. I J K L M N O P Q 3. R S T U V W X Y Z
SECOND CHARACTER GROUP	. : ? ! ; @ / \ ...	
THIRD CHARACTER GROUP	1 2 3 4 5 6 7 8 9 0	

FIG. 2

315

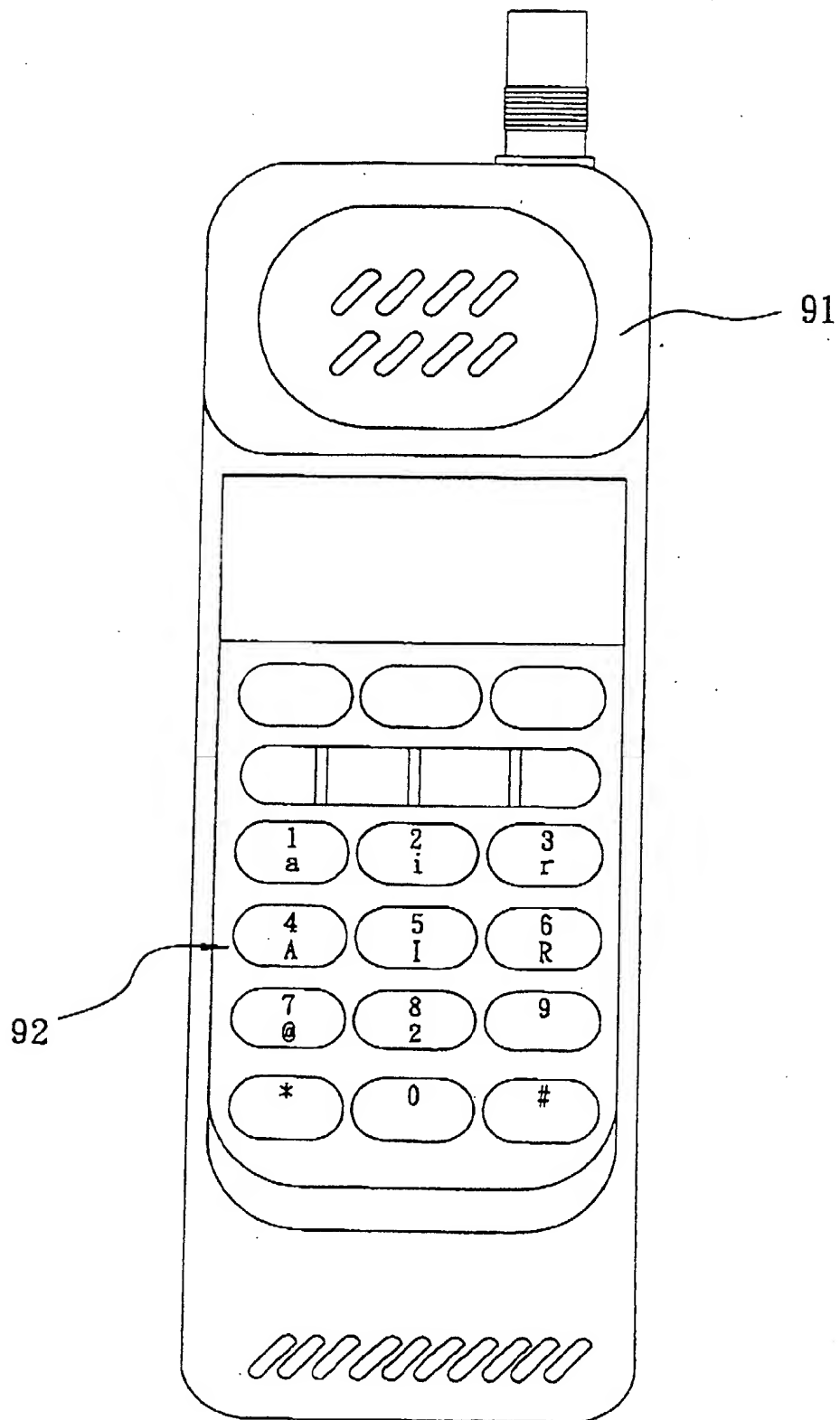


FIG. 3

1	2	3
abcdefgh	ijklmnopq	rstuvwxyz
4	5	6
ABCDEFGH	IJKLMNOPQ	RSTUVWXYZ
7	8	9
punctuation symbols	Arabic numerals	
*	0	#
space key		CTRL
scroll key		

FIG. 4

5/5

TEXT	INPUT KEY	CANDIDATE CHARACTERS	KEY SELECTED
T	6	1R 2S 3T 4U 5V 6W 7X 8Y 9Z	3
o	2	1i 2j 3k 4l 5m 6n 7o 8p 9q	7
n	2	1i 2j 3k 4l 5m 6n 7o 8p 9q	6
y	3	1r 2s 3t 4u 5v 6w 7x 8y 9z	8
:	7	1. 2, 3: 4? 5! 6; 7@ 8/ 9\	3
<input type="checkbox"/>	*		
C	4	1A 2B 3C 4D 5E 6F 7G 8H	3
a	1	1a 2b 3c 4d 5e 6f 7g 8h	1
l	2	1i 2j 3k 4l 5m 6n 7o 8p 9q	4
l	2	1i 2j 3k 4l 5m 6n 7o 8p 9q	4
<input type="checkbox"/>	*		
m	2	1i 2j 3k 4l 5m 6n 7o 8p 9q	5
e	1	1a 2b 3c 4d 5e 6f 7g 8h	5
<input type="checkbox"/>	*		
a	1	1a 2b 3c 4d 5e 6f 7g 8h	1
t	3	1r 2s 3t 4u 5v 6w 7x 8y 9z	3
<input type="checkbox"/>	*		
6	8	11 22 33 44 55 66 77 88 99 00	6
:	7	1. 2, 3: 4? 5! 6; 7@ 8/ 9\	3
0	8	11 22 33 44 55 66 77 88 99 00	0
0	8	11 22 33 44 55 66 77 88 99 00	0
.	7	1. 2, 3: 4? 5! 6; 7@ 8/ 9\	1
<input type="checkbox"/>	*		
M	5	1I 2J 3K 4L 5M 6N 7O 8P 9Q	5
a	1	1a 2b 3c 4d 5e 6f 7g 8h	1
r	3	1r 2s 3t 4u 5v 6w 7x 8y 9z	1
y	3	1r 2s 3t 4u 5v 6w 7x 8y 9z	8

FIG. 5

TEXT INPUTTING METHOD USING
A KEYPAD OF AN ELECTRONIC INSTRUMENT

The invention relates to a text inputting method using a keypad of an electronic instrument, more particularly to a text inputting method which permits input of letters of the English alphabet in upper and lower cases, Arabic numerals, punctuation symbols, various signs, etc., in a text input mode with a lower number of input key strokes.

With the conventional text inputting method using a keyboard or a touch type screen of a computer, the twenty-six letters of the English alphabet, the Arabic numerals, and the punctuation symbols are assigned to and are printed on the keys of the computer keyboard in a substantially one-to-one relationship. An advantage with such a text inputting method is that anyone who knows the English alphabet can perform text inputting with relative ease and speed. Besides, the number of key strokes required is about 1 on average.

However, with the rapid advance of technology in the fields of telecommunications and Internet communication, the input of text is no longer limited to the use of computer keyboards. It is now possible to input text using a numeric keypad of an electronic instrument, such as a cellular phone, for connection to the Internet or transmission of e-mails. A conventional cellular phone 11, such as that shown in Figure 1, is generally provided with a twelve-key keypad 12, including the ten numeric

keys 0-9 and "*" and "#" keys. As such, the letters of the English alphabet have to be arranged on the keys of the keypad 12 in a many-to-one relationship, and the punctuation symbols have to be sacrificed. As shown, the
5 numeric keys "2" to "9" on the keypad 12 are each assigned with a group of three or more letters, as follows:

Key "2" corresponds to "ABC";

Key "3" corresponds to "DEF";

Key "4" corresponds to "GHI";

10 Key "5" corresponds to "JKL";

Key "6" corresponds to "MNO";

Key "7" corresponds to "PQRS";

Key "8" corresponds to "TUV"; and

Key "9" corresponds to "WXYZ".

15 With the keypad 12, inputting of the letter "A" requires one key stroke; the letter "B" requires two; and the letter "C" requires three. In other words, the number of key strokes required to input a letter depends on the letter's sequence in the letter group assigned
20 to the corresponding key. In principle, vowel sounds like "A," "E," "I," "O" and "U" are more frequently used. However, except for the letter "A," the other vowels of the English alphabet are allocated to the second or third place in the corresponding letter groups. As for the
25 most frequently used consonant "S," it is arranged in the fourth place in the letter group on the numeric key "7". In other words, the key "7" has to be stroked four

times in order to input the letter "S". It can therefore be noted that such an inputting method is slow and inconvenient to use.

Moreover, if it is intended to input upper and lower cases of the letters of the alphabet and other symbols, or even Arabic numerals in a text input mode, the number of keys will have to be increased. In short, the processing time will increase if the conventional text inputting method is used to input a text containing letters in upper and lower cases, numerals, and various symbols.

Therefore, the main object of the present invention is to provide a text inputting method using a keypad of an electronic instrument that permits fast and easy input of text containing letters of the English alphabet in upper and lower cases, Arabic numerals, and punctuation symbols.

Accordingly, a text inputting method using a keypad of an electronic instrument includes the steps of arranging letters of the English alphabet into a plurality of first character groups, punctuation symbols in a second character group, and Arabic numerals in a third character group; and assigning the first, second and third character groups to keys on the keypad, and assigning the letters of the English alphabet, the punctuation symbols and the Arabic numerals in each of the first, second and third character groups to the keys

on the keypad. The total number of the first, second and third character groups is less than the number of the keys on the keypad. The number of letters arranged in each of the first character groups is less than the number of the keys on the keypad. In addition, one of the first, second and third character groups is selected by operating the corresponding one of the keys on the keypad, and one of the letters of the English alphabet, the punctuation symbols and the Arabic numerals in the selected one of the first, second and third character groups is subsequently selected by operating the corresponding one of the keys on the keypad.

Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiment with reference to the accompanying drawings, of which:

Figure 1 is a schematic view of a conventional cellular phone having a keypad with a conventional arrangement of the letters of the English alphabet for input of text;

Figure 2 is a table setting forth a preferred embodiment of the arrangement of character groups according to the invention;

Figure 3 is a schematic view of a cellular phone which employs the preferred embodiment of a text inputting method of the invention;

Figure 4 is a look-up table showing input keys of the

cellular phone and their corresponding candidate characters or functions; and

Figure 5 is a table exemplifying text input using the preferred embodiment of the invention.

5 The preferred embodiment of a text inputting method using a keypad of an electronic instrument according to the present invention includes the steps of arranging letters of the English alphabet into a plurality of first character groups, punctuation symbols in a second
10 character group, and Arabic numerals in a third character group; and assigning the first, second and third character groups to keys on the keypad, and assigning the letters of the English alphabet, the punctuation symbols and the Arabic numerals in each of the first,
15 second and third character groups to the keys on the keypad. The total number of the first, second and third character groups is less than the number of the keys on the keypad. The number of letters in each of the first character groups is less than the number of the keys on
20 the keypad, whereas the total number of punctuation symbols in the second character group is greater than the number of the keys on the keypad. In addition, one of the first, second and third character groups is selected by operating the corresponding one of the keys
25 on the keypad, and one of the letters of the English alphabet, the punctuation symbols and the Arabic numerals in the selected one of the first, second and

third character groups is subsequently selected by operating the corresponding one of the keys on the keypad. The term "text" as used herein refers to that which is composed of letters of the English alphabet in upper and lower cases, punctuation symbols, and Arabic numerals. Besides, the term "punctuation symbols" includes other symbols and signs, such as arithmetic signs and commercial signs.

With reference to Figure 2, the letters of the English alphabet in the first character groups are sequentially arranged into three lower case character sets and three upper case character sets. The first one of the lower case character sets is arranged with "a," "b," "c," "d," "e," "f," "g," and "h". The second one of the lower case character sets is arranged with "i," "j," "k," "l," "m," "n," "o," "p," and "q". The third one of the lower case character sets is arranged with "r," "s," "t," "u," "v," "w," "x," "y," and "z". The first one of the upper case character sets is arranged with "A," "B," "C," "D," "E," "F," "G," and "H". The second one of the upper case character sets is arranged with "I," "J," "K," "L," "M," "N," "O," "P," and "Q". The third one of the upper case character sets is arranged with "R," "S," "T," "U," "V," "W," "X," "Y," and "Z".

The Arabic numerals are consecutively arranged in the third character group.

With reference to Figures 3 and 4, the method of this

invention may be adapted for use in a cellular phone 91 provided with a keypad 92. In the preferred embodiment, the keypad 92 includes ten numeric keys. Each of the lower case character sets, the upper case character sets, the second character group, and the third character group is assigned to a respective one of the numeric keys. Referring to Figure 4, the three lower case character sets are assigned to the keys "1," "2," and "3," respectively. The three upper case character sets are assigned to the keys "4," "5," and "6," respectively. The second character group of punctuation symbols is assigned to the key "7". The third character group of Arabic numerals is assigned to the key "8". When one of these keys is pressed, the corresponding letters, punctuation symbols or Arabic numerals assigned thereto will be displayed on a display device of the cellular phone 91. In the preferred embodiment, the initial letters in the three lower case character sets, i.e. "a," "i," and "r," are printed on the corresponding numeric keys "1," "2," and "3," respectively, to indicate the string of letters associated therewith. For instance, when the numeric key "1" is operated, the lower case character set of "abcdefgh" will be displayed on the display device of the cellular phone 91 for selection by the user. The initial letters in the three upper case character sets, i.e. "A," "I," and "R," are indicated on the corresponding numeric keys "4," "5," and "6,"

respectively, to indicate the string of letters associated therewith. The punctuation symbol "@" is printed on the numeric key "7" to stand for the string of punctuation symbols assigned thereto. The number "2" is printed on the numeric key "8" to stand for the string of Arabic numerals assigned thereto.

The keypad 92 further includes a "*" key that serves as both a space key and a scroll key. As the total number of punctuation symbols in the second character group is greater than the number of the keys on the keypad 92, they are arranged into a plurality of pages, the number of the punctuation symbols arranged in each of the pages being less than the number of the keys on the keypad 92. Each punctuation symbol in each of the pages is assigned to a respective one of the keys on the keypad 92. The pages are selected by operating the "*" key.

The keypad 92 further includes a "#" key that is a control key operable for switching between a number input mode and a text input mode. The number input mode can be used when inputting telephone numbers.

Certainly, it should be appreciated that the grouping of the letters of the alphabet, the assignment of the first, second, and third character groups to the keys on the keypad 92, the sequence of the punctuation symbols, and the indications of the first, second, and third character groups on the keys on the keypad 92 are not limited to those exemplified above, and may be

appropriately altered.

To better illustrate the method of this invention, application of the method via the keypad 92 is exemplified with reference to Figure 5 using the sentence
5 "Tony: Call me at 6:00. Mary", which is composed of letters of the English alphabet in upper and lower cases, punctuation symbols, and Arabic numerals.

The letter "T" in upper case belongs to the third upper case character set assigned to the key "6". When the key
10 "6" is pressed, all the candidate letters of the third upper case character set beginning with the letter "R" will be shown on the display device of the cellular phone 91 for selection by the user. The candidate letters are:
1R 2S 3T 4U 5V 6W 7X 8Y 9Z. The key "3" is therefore
15 pressed to select the letter "T".

The letter "o" in lower case belongs to the second lower case character set assigned to the key "2". To input the letter "o," the key "2" is pressed, and the following letters will subsequently appear on the
20 display device of the cellular phone 91 for selection by the user: 1i 2j 3k 4l 5m 6n 7o 8p 9q. The key "7" is therefore pressed to select the letter "o".

To input the letter "n" in lower case, the key "2" is pressed, and the sequence of letters -- 1i 2j 3k 4l
25 5m 6n 7o 8p 9q -- will be shown on the display device of the cellular phone 91 for selection by the user. The key "6" is therefore operated to select the letter "n".

The letter "y" in lower case belongs to the third lower case character set assigned to the key "3". To input "y," the key "3" is operated. The following candidate letters will be shown on the display device of the cellular phone
 5 91 for selection by the user: 1r 2s 3t 4u 5v 6w 7x 8y 9z. The key "8" is pressed to select the letter "y".

The colon ":" is a punctuation symbol in the second character group assigned to the key "7". To input ":", the key "7" is operated, and the punctuation symbols in
 10 the initial page will appear on the display device of the cellular phone 91 for selection by the user, as follows: 1. 2, 3: 4? 5! 6; 7@ 8/ 9\. The key "3" is therefore pressed to select the punctuation symbol ":".

After inputting the word "Tony" and the colon, a space
 15 is inputted by operating the "*" key once.

The letter "C" in upper case belongs to the first upper case character set assigned to the key "4". By stroking the key "4," the following string of upper case letters will be shown on the display device of the cellular phone
 20 91 for selection by the user: 1A 2B 3C 4D 5E 6F 7G 8H. The key "3" is therefore pressed to select the letter "C".

The letter "a" corresponds to the numeric key "1" on the keypad 92. By stroking the key "1," the following
 25 string of letters will be shown on the display device of the cellular phone 91 for selection by the user: 1a 2b 3c 4d 5e 6f 7g 8h. The key "1" is therefore operated

to input the letter "a".

The letter "l" in lower case belongs to the second lower case character set assigned to the key "2". To input the letter "l," the key "2" is operated. The string
5 of letters shown on the display device of the cellular phone 91 for selection by the user will be: 1i 2j 3k 4l 5m 6n 7o 8p 9q. The key "4" is pressed to select the letter "l". This process is repeated to input another "l".

10 Input of the word "call" is thus completed, and a space is inputted thereafter by operating the "*" key once.

The letter "m" in lower case belongs to the second lower case character set assigned to the key "2". When the key "2" is operated, the following string of letters
15 will appear on the display device of the cellular phone 91 for selection by the user: 1i 2j 3k 4l 5m 6n 7o 8p 9q. The key "5" is then pressed to input the letter "m".

The letter "e" belongs to the first lower case character set assigned to the key "1". When the key "1" is pressed, the following string of letters will appear
20 on the display device of the cellular phone 91 for selection by the user: 1a 2b 3c 4d 5e 6f 7g 8h. The key "5" is then operated to input the letter "e".

After inputting the word "me," a space is inputted
25 by operating the "*" key once.

The letter "a" in lower case is inputted in the same manner as described above.

The letter "t" in lower case belongs to the third lower case character set assigned to the key "3". When the key "3" is pressed, the following string of letters will be shown on the display device of the cellular phone 91 for selection by the user: 1r 2s 3t 4u 5v 6w 7x 8y 9z. The key "3" is therefore operated to input the letter "t".

After inputting the word "at," a space is inputted by operating the "*" key once.

To input the numeral "6," the key "8" to which the third character group is assigned is operated, and the following string of numerals will appear on the display device of the cellular phone 91 for selection by the user: 11 22 33 44 55 66 77 88 99 00. The key "6" is pressed to input the numeral "6".

The colon after the numeral "6" is inputted in the same manner as illustrated above.

As for the two zero's following the colon, they are inputted in a manner similar to that for inputting the numeral "6," but the key "0" is pressed instead after operation of the key "8".

To input the period ".", the key "7" to which the second character group is assigned is pressed, and the initial page of punctuation symbols will be shown on the display device of the cellular phone 91 for selection by the user as follows: 1. 2, 3: 4? 5! 6; 7@ 8/ 9\ . The key "1" is pressed to input the period ".".

After inputting "6:00.", a space is inputted by

operating the "*" once.

As for the last word "Mary", the letter "M" in upper case belongs to the second upper case character set assigned to the key "5". By pressing the key "5," the following string of letters will be shown on the display device of the cellular phone 91 for selection by the user: 1I 2J 3K 4L 5M 6N 7O 8P 9Q. The key "5" is therefore operated to input the letter "M".

The letter "a" in lower case is inputted in the same manner as described above.

The letter "r" in lower case belongs to the third lower case character set assigned to the key "3". By operating the key "3," the following string of letters will be shown on the display device of the cellular phone 91 for selection by the user: 1r 2s 3t 4u 5v 6w 7x 8y 9z. The key "1" is pressed to input the letter "r".

The letter "y" in lower case is inputted in the same manner as described above.

In this way, the sentence "Tony: Call me at 6:00. Mary" is completed. It can be seen that the input key strokes required are not many, and the rules of the method are very easy to follow.

In sum, the method of this invention has the following advantages:

1. Input of text containing letters of the English alphabet in both upper and lower cases, Arabic numerals, and punctuation symbols can be facilitated

by using the method of this invention, since input can be conducted in a text input mode without having to switch to a number input mode in between strokes. Besides, with the specific arrangement of the character groups, the input of a letter or a number requires only two key strokes. Although the punctuation symbols are arranged in several pages, since the most commonly used ones can be arranged in the first page, scrolling of pages will not be frequent. Hence, the number of key strokes required is also about two on the average. In view of the above, the method of this invention is far more efficient than that of the prior art.

2. As the letters in the three upper case character sets and in the three lower case character sets are arranged sequentially, selection of the candidate letters is convenient.
3. Since the initial letters of the three upper case character sets, as well as those of the three lower case character sets, as indicated on the keys on the keypad 92 form the word "AIR," it is easy for the user to remember the arrangement of the character sets. Furthermore, the method of this invention can also be adapted for use with a touch type screen.

CLAIMS:

1. A method for inputting text using a keypad of an electronic instrument, the text being composed of letters of the English alphabet, punctuation symbols, and Arabic numerals, said method comprising the steps of:

arranging the letters of the English alphabet into a plurality of first character groups, the punctuation symbols in a second character group, and the Arabic numerals in a third character group, wherein total number of the first, second and third character groups is less than the number of keys on the keypad, and wherein the number of the letters arranged in each of the first character groups is less than the number of the keys on the keypad; and

assigning the first, second and third character groups to the keys on the keypad, and assigning the letters of the English alphabet, the punctuation symbols and the Arabic numerals in each of the first, second and third character groups to the keys on the keypad;

wherein one of the first, second and third character groups is selected by operating the corresponding one of the keys on the keypad, and wherein one of the letters of the English alphabet, the punctuation symbols and the Arabic numerals in the selected one of the first, second and third character groups is subsequently selected by operating the corresponding one of the keys on the

keypad.

2. The method of Claim 1, wherein the letters of the English alphabet include lower case and upper case letters, the first character groups including three
5 lower case character sets arranged with the lower case letters, and three upper case character sets arranged with the upper case letters.

3. The method of Claim 2, wherein:

a first one of the lower case character sets is
10 arranged with "a," "b," "c," "d," "e," "f," "g," and "h";

a second one of the lower case character sets is arranged with "i," "j," "k," "l," "m," "n," "o," "p," and "q";

a third one of the lower case character sets is
15 arranged with "r," "s," "t," "u," "v," "w," "x," "y," and "z";

a first one of the upper case character sets is arranged with "A," "B," "C," "D," "E," "F," "G," and "H";

a second one of the upper case character sets is
20 arranged with "I," "J," "K," "L," "M," "N," "O," "P," and "Q"; and

a third one of the upper case character sets is arranged with "R," "S," "T," "U," "V," "W," "X," "Y," and "Z".

25 4. The method of Claim 2, wherein the keypad includes ten numeric keys, each of the lower case character sets, the upper case character sets, the second character group

and the third character group being assigned to a respective one of the numeric keys.

5. The method of Claim 4, wherein the keypad further includes a "*" key that serves as a space key.

5 6. The method of Claim 1, wherein the keypad further includes a "*" key, the total number of punctuation symbols in the second character group being greater than the number of the keys on the keypad, the punctuation symbols in the second character group being arranged into
.10 a plurality of pages that are selected by operating the "*" key, the number of the punctuation symbols arranged in each of the pages being less than the number of the keys on the keypad, each of the punctuation symbols arranged in each of the pages being assigned to a
15 respective one of the keys on the keypad.

7. The method of Claim 1, wherein the keypad further includes a "#" key that is operable for switching between a number input mode and a text input mode.

8. The method of Claim 1, wherein the letters of the
20 English alphabet are sequentially arranged in the first character groups, and the Arabic numerals are consecutively arranged in the third character group.

9. The method substantially as hereinbefore described with reference to and as illustrated in Figures 2 to 5
25 of the accompanying drawings.



Application No: GB 0119574.2
Claims searched: 1-9

Examiner: Melanie Gee
Date of search: 18 April 2002

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.T): G4H (HKK)
Int Cl (Ed.7): G06F; H03M
Other: Online: WPI, EPODOC, PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2284289 A (SAMSUNG ELECTRONICS CO. LTD), see page 7 line 5 - page 9 line 30, and page 17 lines 10-21.	
A	US 4307266 (MESSINA), see Fig. 1 and col. 3 lines 55-66.	
A	US 3870821 (STEURY), see col. 6 line 57 - col. 8 line 9.	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.